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(56) Documents Cited

GB 1451666 A

US 4700424 A

US 4090668 A

US 3888412 A

(58) Field of Search

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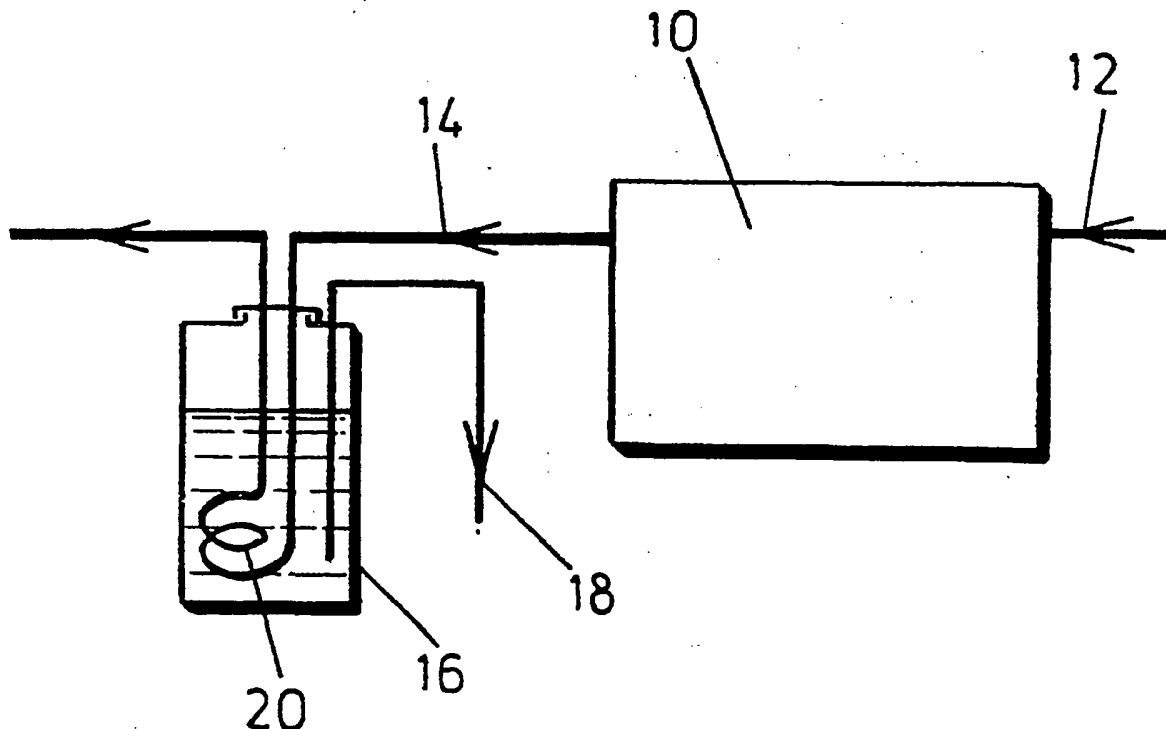
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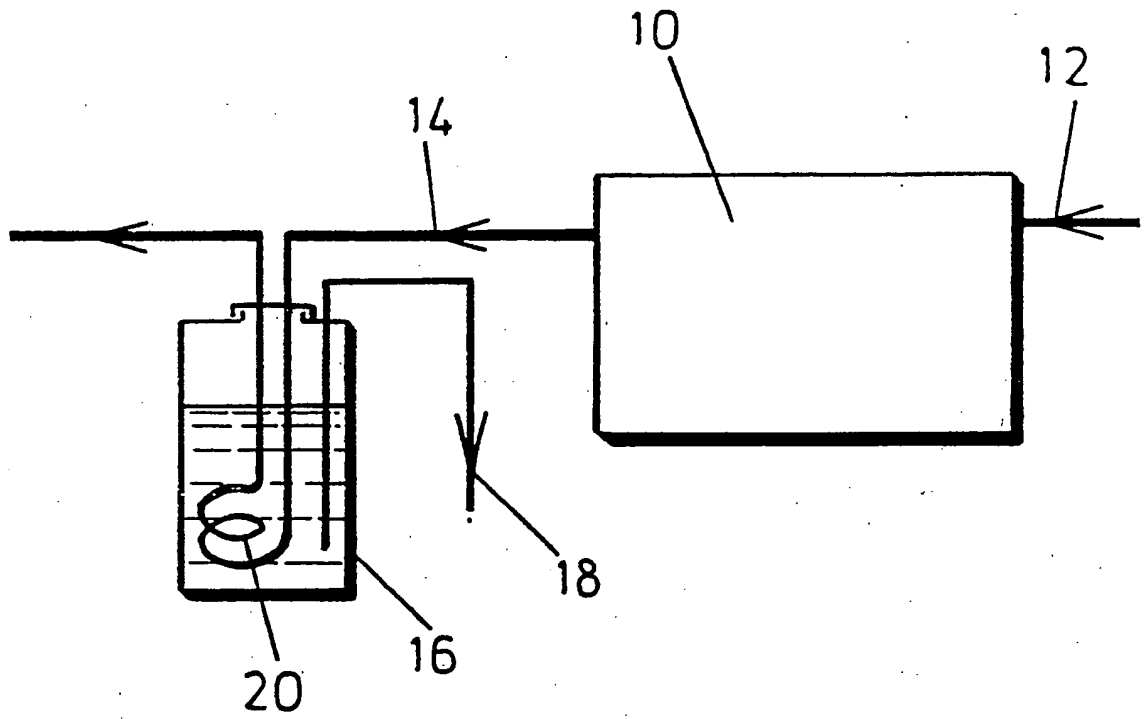
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(54) Windscreen washing system with heated reservoir

(57) A motor vehicle windscreen washing system comprises a reservoir (16) for washing water and heat exchanger, preferably a copper coil (20), in the reservoir and connected in series to the engine block coolant system of the motor vehicle. The supply to the heat exchanger may be through the cap or the wall of the reservoir.



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Title: Improvements in and relating to motor vehicle  
windscreen washing systems

#### DESCRIPTION

5           This invention concerns improvements in and  
relating to motor vehicle windscreen washing systems.

          All modern motor vehicles have a system for  
cleaning their windscreen while the vehicle is being  
driven. The system involves pumping water from a supply  
10       vessel (water bottle), usually situated in the engine  
compartment of the vehicle, through tubing to one or  
more spray nozzles for directing the water onto the  
windscreen. To enhance the cleaning effect of the water  
detergent may be added to the water and usually  
15       operation of the pump is linked to operation of the  
windscreen wipers to act simultaneously with water being  
sprayed onto the windscreen.

          Unfortunately during winter the water in the  
washer bottle can freeze, so that the windscreen washing  
20       system is inoperative. In addition, cold water is not  
necessarily an effective cleaner on its own. Hence, the  
desirability of adding detergent to the wash water.

          An object of this invention is to provide a motor  
vehicle windscreen washing systems that does not suffer  
25       from the above-mentioned disadvantages.

According to the present invention it is proposed that a motor vehicle windscreen washing system, include a reservoir for washing water which has means for heating the water therein.

5           It is preferred that said heating means comprise a heat exchanger within the reservoir wherein heated water is passed through a pipe, tube or the like within the reservoir whereby heat therefrom is transferred to the water within the reservoir. The pipe, tube or the  
10           like preferably includes one or more turns, such as to form a coil or an undulating shape. The pipe, tube or the like may conveniently fit through a cap for the reservoir or may have an inlet and/or an outlet through a wall of the reservoir.

15           Heated water for the heat exchanger may conveniently be provided as the engine coolant water exiting the engine block of the motor vehicle. The engine coolant water is normally fed to a heat exchanger for a heating system for the interior of the motor  
20           vehicle and the heated water can be passed through the washing water reservoir either before or after it passes to the vehicle heating system heat exchanger. Alternatively, heated water may be diverted from piping carrying the heated water and returned thereto after  
25           passing through the washing water reservoir. In either alternative it may be necessary to choose the size of

pipe for the washing water reservoir carefully so as not to inhibit the water flow unduly.

The material used for the pipe, tube or the like through the washing water reservoir is preferably of a highly heat conductive material. Copper piping is preferred as that material.

It has been found that water exiting from the engine block is at about 90°C and so is sufficiently hot to melt ice on the washing water reservoir fairly quickly and to maintain the washing water at a temperature of about 65-70°C which is sufficient to enhance its cleaning action on the windscreen. The heated washing water can also be used to clear ice from a motor vehicle windscreen.

This invention will now be further described, by way of example only, with reference to the accompanying drawing which is a schematic illustration of the invention.

Referring to the accompanying drawing, an engine block 10 of a motor vehicle has cooling water passing through it. Cool water enters through inlet pipe 12 and heated water exists through outlet pipe 14. The heated water normally passes through a heat exchanger (not shown) over which air can be drawn to provide heated air for the motor vehicle interior. After the heat exchanger the still hot water is passed through a

radiator (not shown) where it is cooled by a fan and by air passing through openings of the radiator being positioned at the front of the vehicle behind the protective grill.

5           The heated water is, in accordance with the invention, passed through a vessel 16 containing water used to wash the motor vehicle windscreen either before or after the heating system heat exchanger. Water from the vessel 16 is usually pumped by means of an  
10 electrically operated pump through an outlet pipe 18 to spray nozzles located at the foot of the windscreen arranged to spray the water onto the windscreen for cleaning.

          The heated water is actually passed through a,  
15 preferably copper, coil 20 in the vessel 16 so as to heat up the water in the vessel. The coil 20 is preferably of the same or nearly the same box size as the pipe 14 so as not to inhibit the flow of water through the heating/coiling system of the motor vehicle.  
20 The heated water passing through the vessel may actually unfreeze water in the vessel so that the water windscreen can be cleaned shortly after the motor vehicle engine is started. Water passing through the engine block becomes hot fairly quickly. Once the water  
25 in the vessel 16 has become heated say upto about 60°C, it has an improved cleaning effect on a motor vehicle

windscreen.

In an alternative embodiment, the pipe carrying heated water into the vessel 16 is not a continuation of the heating/cooling system but is a take-off therefrom.

## CLAIMS

1. A motor vehicle windscreen washing system including a reservoir for washing water and means for heating the water in the reservoir.
2. A motor vehicle windscreen washing system as  
5 claimed in claim 1, wherein the heating means comprises a heat exchanger within the reservoir.
3. A motor vehicle windscreen washing system as  
10 claimed in claim 2, wherein the heat exchange comprises a pipe, tube or the like in the reservoir and through which heated water is passed.
4. A motor vehicle windscreen washing system as claimed in claim 3, wherein the pipe, tube or the like includes one or more turns.
- 15 5. A motor vehicle windscreen washing system as claimed in claim 4, wherein the pipe, tube or the like is in the form of a coil.
6. A motor vehicle windscreen washing system as  
20 claimed in claim 4, wherein the pipe, tube or the like has an undulating shape.
7. A motor vehicle windscreen washing system as claimed in any one of claims 3 to 6, wherein the pipe, tube or the like has its inlet and/or outlet through a cap of the reservoir.
- 25 8. A motor vehicle windscreen washing system as



claimed in any one of claims 3 to 6, wherein the pipe, tube or the like has its inlet and/or outlet through a wall of the reservoir.

9. A motor vehicle windscreen washing system as  
5 claimed in any one of claims 3 to 8, wherein heated water for the system is supplied by engine coolant water exiting an engine block of the motor vehicle.
10. A motor vehicle windscreen washing system as  
10 claimed in any one of the claims 3 to 9, wherein the pipe, tube or the like is made of highly heat conductive material.
11. A motor vehicle windscreen washing system as  
15 claimed in claim 10, wherein the pipe, tube or the like is made of copper.
12. A motor vehicle windscreen washing system substantially as hereinbefore described with reference to and as illustrated in the accompanying drawing.

E. Examiner's report to the Comptroller under Section 17 (The Search report)		GB 9320602.7
<b>Relevant Technical Fields</b>  (i) UK Cl (Ed.L)      A4F (FAMC) (ii) Int Cl (Ed.5)      B60S 1/48  <b>Databases (see below)</b> (i) UK Patent Office collections of GB, EP, WO and US patent specifications.  (ii)		Search Examiner A C HOWARD
		Date of completion of Search 25 NOVEMBER 1993
		Documents considered relevant following a search in respect of Claims :- 1-11

#### Categories of documents

<b>X:</b>	Document indicating lack of novelty or of inventive step.	<b>P:</b>	Document published on or after the declared priority date but before the filing date of the present application.
<b>Y:</b>	Document indicating lack of inventive step if combined with one or more other documents of the same category.	<b>E:</b>	Patent document published on or after, but with priority date earlier than, the filing date of the present application.
<b>∴</b>	Document indicating technological background and/or state of the art.	<b>&amp;:</b>	Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages		Relevant to claim(s)
X	GB 1451666	(ASSOCIATED ENGINEERING) see page 3 lines 32-50; Figure 5	1-5,8-11
X	US 4700424	(HAGEN) see column 2 lines 51-55	1-5,8,9
X	US 4090668	(KOCHENOUR) see column 4 lines 38-48	1-5,8,9
X	US 3888412	(LINDO) whole document relevant	1-4,6,7,9 10

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).